

What is claimed is

1. An initializing method for a Very high bit rate Digital Subscriber Line (VDSL) between two stations comprising:

(a) handshaking for exchanging basically needed information between the two stations in a first one space mode, and for determining whether or not each of the two stations supports a second tone space;

(b) switching the first tone space mode to the second tone space mode by detecting a short loop in each of the two stations for adjusting a tone space when it is determined in step (a) that each of the two stations supports the second tone space; and

(c) exchanging information actually needed in data communications between the two stations in the second tone space mode for an actual initialization.

2. The method of claim 1, wherein the step (b) comprises:

(b1) each station receiving a signal corresponding to the station, using some signals in the information needed in data communications used in step (c), and at the same time detecting a short loop; and

(b2) each station performing final negotiation for determining whether or not the step (c) is performed in the second tone space mode, according to the result of the short loop detection.

3. The method of claim 2, wherein in step (b1), each station obtains the result of the short loop detection based on the level of Power Spectral Density (PSD) of a signal which is received in a high frequency band transmitted from the other station.

4. The method of claim 2, wherein the step (b) further comprises:

(b3) each station switching from the first tone space mode to the second tone space mode in an idle cycle when it is determined that the step (c) is performed in the second tone space mode in step (b2).

5. The method of claim 1, wherein in step (a) whether or not the two stations are capable of supporting the second tone space is found by exchanging messages, and capability information is transmitted through a non-standard information field.

6. The method of claim 1, wherein the two stations are a modem at an optical network unit and a modem at a remote terminal, respectively.

7. A system supporting an initializing method for a Very high bit rate Digital Subscriber Line (VDSL), the system having two stations, each of which performs:

a handshaking step for exchanging basically needed information between the two stations in a first one space mode;

a switching step for switching from the first tone space mode to the second tone space mode by detecting a short loop, if it is determined that the station supports the second tone space; and

an actual initialization step for exchanging information actually needed in data communications between the two stations in the second tone space mode.

8. The system of claim 7, wherein the switching step comprises:

each station receiving a signal corresponding to the station, using some signals in the information needed in data communications, and at the same time detecting a short loop; and

each station performing final negotiation for determining whether or not the actual initialization step is performed in the second tone space mode, according to the result of the short loop detection.

9. The system of claim 8, wherein the result of short loop detection is obtained by each station, based on the level of Power Spectral Density (PSD) of a signal which is received in a high frequency band transmitted from the other station.

10. The system of claim 7, wherein in the handshaking step, whether or not the two stations are capable of supporting the second tone space is found by exchanging messages, and capability information is transmitted through a non-
5 standard information field.

11. The system of claim 7, wherein the two stations are a modem at an optical network unit and a modem at a remote terminal, respectively.

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